

perature of the interior surface of the fly will be less attracted, or, which is the same, more repelled. Hence, whether the inner surface of the bulb be cooler or hotter than the fly, a reversal in the direction of rotation while the fly is being heated, indicates a reversal in the order of absorbing power of the two faces, and that, again, shows that the order is different for different components of the total radiation, and that the ratio of the intensity of those components has been changed.

It is perhaps hardly necessary to observe that the radiometers mentioned in this paper are of the usual form—that is to say, that their arms are symmetrical, so far as *figure* is concerned, with respect to a vertical plane passing through the point of support. Accordingly the rotation which is attained, for instance, with a radiometer with concave disks of aluminium, alike as to material on both faces (of which kind, again, I owe a beautiful specimen to Mr. Crookes's kindness), has not been referred to. This rotation, depending on the more favourable presentation to the bulb of the outer (and therefore nearer and more efficient) portions of the fly on the convex than on the concave side, has nothing to do with the one isolated subject to which the present paper relates, namely, the elucidation of the peculiar behaviour in certain cases of certain kinds of radiometers, by a consideration of the heterogeneous character of the total heat-radiation.

(To be continued.)

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

LEEDS.—By the liberality of the 'Worshipful the Drapers' Company, the Council of the Yorkshire College are prepared to appoint an instructor in coal mining at the stipend of 100*l.* per annum and half the students' fees. A portion only of the instructor's time will be required. The fuller conditions and duties of the office may be learned from the secretary. Applications and testimonials must be received on or before January 18.

LEXINGTON, U.S.—In connection with the Centennial, efforts have been made in the United States to raise an endowment fund for Washington and Lee University, at Lexington, Va. The institution dates from colonial times, and was endowed, while it was still only an academy, by Washington and other soldiers of the Revolution. Among other recent benefactors of the University is Mr. L. J. McCormick, of Chicago, who has offered to give his magnificent telescope, made by Alvan Clark, of Cambridge, U.S., at a cost of 50,000 *dols.*, provided the institution would raise the necessary funds to equip and maintain it. The trustees have not yet been able to do anything towards the acceptance of this proposal. It would be a great misfortune if the conditions could not be complied with, and we hope that the suggestion that the ladies in various parts of the States should take the matter up will be complied with; there is no doubt if they make up their minds to success they will succeed.

BERLIN.—The great Prussian university is closely competing now with the Leipzig University in point of attendance. In the calendar which has just appeared we notice that the number of matriculated students during the present winter amounts to 2,839, an increase of 600 on the summer semester. They are divided among the faculties as follows: theological 168, legal 1,163, medical 345, philosophical 1,163. There are 210 foreigners in the list, including 42 from America. Besides these matriculated students, there are 2,200 other persons in attendance on the lectures, belonging to the various technical and art schools of the city. The corps of instructors numbers 210, nearly half of whom are in the philosophical faculty.

BONN.—The winter attendance at the University is 859, an increase of sixty-two on the preceding semester. The philosophical faculty includes 375, the legal 219, the medical 126, the Catholic theological, 89, and the Evangelical, 50.

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, December 6.—Prof. Allman, president, in the chair.—Messrs. J. N. Fitch, J. S. Gamble, F. S. Piggott, A. B. Stewart, and Prof. Macoun were elected Fellows.—Mr. Thiselton Dyer exhibited portions of the "Nam-mu" tree, which grows in Yunnan, 25°–26° N. lat. The Chinese nobility greatly prize its wood for building purposes and for making coffins, and enormous columns in tombs of the Ming dynasty, 300 years old, are still extant. Supposed to be teak, it probably

rather belongs to the Lauraceæ, the leaves closely resembling those of *Phæbe pallida*. Mr. Dyer also exhibited a seed of *Entada scandens*, and another of an anonaceous plant (*Cyathocalyx Maingayi*?) found in the cecum of *Rhinoceros sumatrensis* from Chittagong, and dissected at the Zoological Gardens, Regent's Park; and he likewise showed fruits of *Oncocarpus villosus* from the crop of a fruit-pigeon (*Carpophaga latrans*).—Attention was afterwards called by Mr. Dyer to the fruit-head of an Indian *Pandanus* made into a brush, the fibrous tissue of the drupes forming the bristles, and this instrument was said to be used to scrape cloth, like our teasle (*Dipsacus*).—Flowers and foliage of *Cinchona* (*C. calisaya*, vars., *Josephiana* and *Anglica*) grown in the garden of Mr. J. Elliot, at Tottenham, were exhibited by that gentleman, whose researches among the quinine-bearing trees are already well known and appreciated.—Mr. Moggridge read a note on the occurrence at Wallis Down, a heath near Bournemouth, of *Daboecia polifolia*.—A paper on certain organs of the Cidaridæ was communicated by Mr. Chas. Stewart, who illustrated, amongst others, the subjoined points of his recent investigations. Among the sea-urchins the families Diadematidæ, Echinometridæ, and Echinidæ, have long been known to possess external branchiæ; but the existence of such in the Cidaridæ has been denied by Müller, though insisted on by Alex. Agassiz. Mr. Stewart finds in *Dorocidaris papillata* five organs corresponding to branchiæ, but situated internally. The water bathing these interior gills finds ingress and egress by a crevice near the "compasses," the peculiar mechanism of the teeth and jaws producing the temporary opening in question. As respects the pericellariæ of Cidaridæ, where the jaw ends in a terminal hollow fang, there is an additional orifice to that at the tip, besides two glands in the vicinity; he suggests this to be a poison apparatus, comparable to the fangs of the spider, and poison sac and tooth of venomous serpents.—The Secretary read a paper by Dr. I. Bayley Balfour, "Observations on the genus *Pandanus*." Few families of plants present more difficulty in their elucidation than the Pandanaceæ; this by variability of species, difficulty of procuring the male flower, with little character in the leaves, while the fruit loses its distinctive features in drying. The Screw-pines had attracted the notice of the early voyagers, but their descriptions are confused. To Rumphius we owe the name *Pandanus*, though his account and figures are poor compared with Reede's of a century before. Linnaeus, though indicating a plant under the name *Bromelia sylvestris*, omitted the genus *Pandanus*, a want supplied by his son. Afterwards, as species increased, many new genera were unnecessarily introduced, which Dr. Balfour is now inclined to reject; even Brongniart's New Caledonia genera do not claim acceptance. *Pandanus* runs over a great breadth of longitude, viz., from east tropical Africa through the Mascarene Islands, India, Indian Archipelago, and Australia, to the Sandwich Islands. The East Archipelago and the Mascarenes are centres whose species do not commingle. There succeeds in this paper other facts and an extensive list of names and references to all the Pandani known.—The substance was given of a report on a small collection of insects obtained by Dr. J. C. Ploëm, in Java, with description of a new species of *Hoplia*, by Chas. O. Waterhouse, of the British Museum.—The Secretary read a communication by Dr. J. Stirton, viz., "Notes on the Rev. Mr. Crombie's paper on the Lichens of the *Challenger* Expedition," and another note by Dr. R. C. A. Prior, relative to the migration of wild geese, purported to have passed from North America to the African coast.

Physical Society, December 15.—Prof. G. C. Foster, president, in the chair.—The following candidates were elected Members of the Society:—W. E. Ayrton, J. M. Cameron, J. W. Clark, J. E. Judson, B.A., H. N. Moseley, M.A., F.R.S., Lord Rayleigh, M.A., F.R.S., W. N. Stocker, M.A., and H. T. Wood.—Mr. C. W. Cooke read for the author, Prof. S. P. Thompson, a paper on permanent Plateau films, and exhibited the process of their formation. After a brief enumeration of the various attempts made by Plateau himself, Schwartz, Mach, Rottier, and others, most of which are described in the work of Plateau, the author described his own experiment on the subject. As the result of these he concludes that the best films are obtained by using a mixture of 46 per cent. of pure amber-coloured resin, and 54 of Canada balsam, which should be heated to from 93° to 95° C. The frames for forming the films are made of brass wire 0.3 mm. in diameter, and when thicker, wire is employed they are found to be irregular in consequence of the retention of heat by the metal. The films are obtained by simply introducing these frames into the heated

mixture, and they harden almost immediately on exposure to the air; but better results are obtained by slow drying in an air bath heated up to 80° C., and allowed to cool. In proof of the toughness of the films it was mentioned that a flat circular film 4 cm. in diameter, had supported a 50-gramme brass weight at its centre.—Mr. Sedley Taylor then exhibited some experiments in illustration of a paper on the colours exhibited by vibrating liquid films which he has recently communicated to the Royal Society.—Dr. Guthrie exhibited a simple lecture illustration of the action of the telephone. Two similar coils of wire are placed one on the end of a bar magnet, and the other on a soft iron core. A tin disc about three inches in diameter is suspended by two threads almost in contact with one end of this latter, and when a similar disc is brought, at regular intervals, against the end of the magnet which is provided with the coil, a distinct movement of the first-named disc is observed which can be easily increased by properly timing the movement of the inducing disc.

Anthropological Institute, November 27.—Mr. John Evans, D.C.L., F.R.S., president, in the chair.—The election of five new members was announced.—Major-Gen. A. Lane Fox, F.R.S., exhibited various objects from Istria and Scinde.—The Director read some notes on Socotra, by Capt. Hunter, R.N., in which some of Lieut. Wellstead's statements about that island were criticised.—A paper on the Záparos, by Mr. A. Simpson, was then read, in which many interesting observations of these tribes of "Equador" were recorded. Their wonderful tracking powers, abstinence from heavy meats, such as tapir and peccari, curious mode of training hunting-dogs, were described. Their enjoyment in the destruction of life, human or animal, with the exception of the alligator, which they will not touch themselves, was very marked. The Napos do not resemble them in this respect. The Záparos are very disunited, and wander about in separate hordes, the worst of which are the Supinus. Courtship is sometimes carried on by a silent invitation by the suitor to his elect to cook his food. If rejected, he tries elsewhere. The Záparos are described as of a happy and cheerful disposition, very superstitious, believing in an evil spirit, and very poor and almost nude.—A paper on the Malayo Polynesians, by Rev. S. J. Whitmee, was then read, in which the author noted the high social position of women in the Samoan group, as compared with their place among the black Polynesians. The existence of hereditary ranks and titles among the brown Polynesians seems to the author to indicate a former higher condition. The author referred to the difficulties experienced by missionaries in obtaining the true versions of the native poems and myths, and noted the custom of preserving the myths in poetry as well as prose, the two versions acting one as a check on the other, and so preserving the correctness one of the other. In the discussion, Major-Gen. A. Lane Fox, Mr. Blackmore, Mr. Hyde Clarke, and others, took part.

Entomological Society, December 5.—J. W. Dunning, vice-president, in the chair.—Mr. W. L. Distant exhibited specimens of the rare species of Hemiptera-Heteroptera, *Tetroxin beauvoisii*, and *Oncocephalus subspinosus*, from the West Coast of Africa.—Mr. F. Smith exhibited a fine series of *Macrops labiata*, male and female, captured near Norwich by Mr. I. B. Bridgman.—Mr. Smith also exhibited a specimen of *Rophites quinquespinosus*, a genus and species new to the British Hymenoptera, captured near Hastings by the Rev. E. H. Bloomfield.—Mr. Meldola exhibited three fine photographic enlargements of micro-photographs (two being of parts of insects) taken by Mr. Edward Viles, of Pendryl Hall, Wolverhampton. The photographs, which had been exhibited at the recent exhibition of the Photographic Society were 30 x 24 in., while the original negatives were 3 in. square.—Mr. Meldola likewise performed an acoustical experiment illustrating the action of the stridulating apparatus in the *Phasma (Pterinoxylus)*, an account of which had been given to the society by Mr. Wood Mason at the last meeting.—Mr. Wood Mason made further remarks on the structure of the stridulating organ in scorpions.—Mr. F. Smith mentioned a case of stridulation occurring in a British species of *Curculionidae (Acalles)*.—Mr. Dunning called attention to a striking case of mimicry recorded by Mr. Neville Goodman in the *Proceedings* of the Cambridge Philosophical Society for February, 1877, the mimic being a species of *Laphria*, and the model, the well-known Egyptian hornet, *Vespa orientalis*.—Mr. F. Smith read a paper containing descriptions of new species of hymenopterous insects from New Zealand, collected by Prof. Hutton at Otago.—Mr.

A. G. Butler communicated a paper on the Lepidoptera of the Amazons, collected by Dr. James W. H. Trail during the years 1873 to 1875.—Dr. Sharp communicated the following papers:—Descriptions of eight new species and a new genus of *Cossonides*, from New Zealand, and descriptions of some new species and a new genus of *Rhyncophorous Coleoptera*, from the Hawaiian Islands.

MANCHESTER

Literary and Philosophical Society, October 16.—Mr. E. W. Binney, F.R.S., president, in the chair.—The President exhibited to the meeting some coal-measure plants and other organic remains from Spain. From the character of the fossil organic remains and the nature of the strata he was led to believe that the coal-field of Puertollano was of the same geological age as our true English coal-measures.—Mr. M. P. Pattison Muir, F.R.S.E., exhibited and gave a description of a modified form of Hofmann's apparatus for determining vapour densities.—Note on an edible clay from New Zealand, by M. M. Pattison Muir, F.R.S.E. The author lately received from Mr. R. E. Day, a small specimen of a clay which is greedily eaten by the sheep in a certain district in New Zealand. The clay was brought by Mr. Day from Simon's Pass Station, Mackenzie Country, South Island. It there forms a range of low bare hills: the sheep (merino sheep) eat very considerable quantities of the clay without appearing to be any the worse for it. It is supposed by the shepherds that the clay must contain salt, and that it is to supply the deficiency of this article of food that the sheep resort to the earth. The analysis shows that very probably the shepherds are right:—Silica, 61.25; alumina, 17.97; ferric oxide, 5.72; calcium oxide, 1.91; magnesium oxide, 0.87; alkalis (as chlorides), 3.69; organic matter, 1.77; water, 7.31 = 100.49.—On the decomposition of calcium sulphate by alkaline chlorides; a contribution to agricultural chemistry, by M. M. Pattison Muir, F.R.S.E.—On some thionates, by H. Baker, student in the Owens College. Communicated by Prof. C. Schorlemmer, F.R.S.

VIENNA

Imperial Academy of Sciences, October 18.—On the chemical nature of peptone and its relation to albumen, by M. Herth.—On the addition of prussic acid to urea, and on the action of trichloric lactic acid on urea, by M. Cech.—Transformation of cyanamide into ammelide, by M. M. Cech and Dehmelt.—New discoveries on the negative heliostatism of above-ground parts of plants, by M. Wiesner.—On Fraunhofer's rings, Quetlet's stripes, and allied phenomena, by M. Exner.

October 25.—On the connection of n straight lines in the plane, and on properties of the triangle and two propositions of Steiner therewith connected, by M. Kantor.—On the structure and the growth of some forms of mould-fungus, by M. Hassloch.—On the development of the small pollen-plants of *Colchicum autumnale* L., by M. Tomaschek.—On the secular acceleration of the mean motion of the moon, by M. v. Littrow.

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